

**WHAT IS CLAIMED IS:**

- 1                   1. A printed circuit board for use in an electronic device package  
2 comprising:
  - 3                   a substrate layer comprising impregnated glass fibers;
  - 4                   a non-conductive layer comprising a dielectric material free of continuous  
5 glass fibers applied to said substrate layer; and
  - 6                   an electrically conductive circuitry comprising a conductive material  
7 formed on said non-conductive layer such that said non-conductive layer lies between said  
8 substrate layer and said conductive material to prevent shorts therebetween caused by  
9 migration of said conductive material along said glass fibers.
- 1                   2. The printed circuit board as recited in claim 1 further comprising a  
2 plated through hole extending through said substrate layer and said non-conductive layer  
3 and electrically coupled to said circuitry.
- 1                   3. The printed circuit board as recited in claim 1 wherein said  
2 dielectric material comprises a photoimageable dielectric material.
- 1                   4. The printed circuit board as recited in claim 1 wherein said  
2 dielectric material comprises polyimide.
- 1                   5. The printed circuit board as recited in claim 1 wherein said  
2 dielectric material comprises Kevlar-based paper impregnated with epoxy resin.
- 1                   6. The printed circuit board as recited in claim 1 wherein said  
2 dielectric material is resin-coated copper foil.
- 1                   7. The printed circuit board as recited in claim 1 wherein said  
2 substrate layer is prepreg comprising a glass fabric impregnated with epoxy resin.

1                   8. The printed circuit board as recited in claim 1, further comprising at  
2 least one clearance filled with said dielectric material.

1                   9. An electronic device package comprising:  
2                   at least one substrate, said substrate comprising impregnated glass fibers;  
3                   an electronic device coupled to said substrate;

4                   a non-conductive layer comprising a dielectric material free of continuous  
5 glass fibers applied to said substrate; and

6                   electrically conductive circuitry comprising a conductive material formed  
7 on said non-conductive layer or formed on said substrate such that said non-conductive  
8 layer lies between said substrate and said conductive material to prevent shorts  
9 therebetween caused by migration of said conducting material along said glass fibers.

1                   10. The electronic device package as recited in claim 9 further  
2 comprising at least one power plane.

1                   11. The electronic device package as recited in claim 10 further  
2 including a second non-conductive layer positioned between said circuitry and said power  
3 plane.

1                   12. The electronic device package as recited in claim 10 further  
2 comprising at least one plated through hole extending through each said substrate and  
3 each said non-conductive layer.

1                   13. The electronic device package as recited in claim 12 wherein said  
2 non-conductive layer is positioned between said through hole and said power plane to  
3 prevent a short therebetween caused by migration of said conductive material along said  
4 glass fibers.

1                   14.    The electronic device package as recited in claim 12 wherein said  
2    non-conductive layer is positioned between said through hole and said circuitry.

1                   15.    The electronic device package as recited in claim 9, further  
2    comprising at least one clearance filled with said dielectric material.

1                   16.    The electronic device package as recited in claim 9 wherein said  
2    electronic device is electrically coupled to said circuitry.

1                   17.    The electronic device package as recited in claim 9 wherein said  
2    circuitry includes a plurality of solder pads.

1                   18.    The electronic device package as recited in claim 17 further  
2    comprising a solder ball coupled to one of said solder pads.

1                   19.    The electronic device package as recited in claim 9 wherein said  
2    dielectric material comprises a photoimageable dielectric material.

1                   20.    The electronic device package as recited in claim 9 wherein said  
2    dielectric material comprises polyimide.

1                   21.    The electronic device package as recited in claim 9 wherein said  
2    dielectric material comprises Kevlar-based paper impregnated with epoxy resin.

1                   22.    The electronic device package as recited in claim 9 wherein said  
2    dielectric material comprises resin-coated copper foil.

1                   23.    The electronic package device as recited in claim 9 wherein said  
2    substrate layer is prepreg comprising glass fabric impregnated with epoxy resin.

1                   24.    An electronic device package comprising:

2                            a non-conductive substrate comprising a dielectric material free of  
3    continuous glass fibers;

4 an electronic device coupled to said substrate; and

5 electrically conductive circuitry comprising a conductive material formed  
6 on said substrate wherein said electronic device is electrically coupled to said circuitry.

1                   27. The electronic device package as recited in claim 24 wherein said  
2                   circuitry includes a plurality of solder pads.

1 31. An electronic device package comprising:

2 at least one substrate, said substrate comprising impregnated glass fibers;

3 at least one plated through hole extending through each said substrate;

4 at least one conductive power plane;

5 an electronic device coupled to said substrate; and

6                   a non-conductive layer comprising a dielectric material free of continuous  
7    glass fibers positioned between each said plated through hole and each said power plane to  
8    prevent a short therebetween caused by migration of said conductive material along said  
9    glass fibers.

1                   32.    The electronic device package as recited in claim 31 further  
2    including additional non-conductive layers is positioned between said substrates and said  
3    power planes.

1                   33.    The electronic device package as recited in claim 31 further  
2    comprising electrically conductive circuitry comprising conductive material formed on the  
3    surface of said substrate.

1                   34.    The electronic device package as recited in claim 32 wherein non-  
2    conductive layers are positioned between said circuitry and said power planes.

1                   35.    The electronic device package as recited in claim 32 further  
2    comprising at least one clearance filled with said dielectric material.

1                   36.    A printed circuit board for use in an electronic device package  
2    comprising:

3                   a substrate layer comprising impregnated glass fibers;  
4                   a non-conductive layer comprising a dielectric material free of continuous  
5    glass fibers applied to said substrate layer; and  
6                   an electrically conductive circuitry comprising a conductive material:  
7                   (a)    formed on said non-conductive layer, and  
8                   (b)    encapsulated by said non-conductive layer  
9                   such that said non-conductive layer lies between said substrate layer and  
10                  said conductive material to prevent shorts therebetween caused by  
11                  migration of said conductive material along said glass fibers.

1                   37. A printed circuit board as recited in claim 1 wherein the thickness  
2 of said non-conductive layer is between 0.5 mils and 5 mils.

1                   38. An electronic device package as recited in claim 9 wherein the  
2 thickness of said non-conductive layer is between 0.5 mils and 5 mils.

1                   39. An electronic device package as recited in claim 24 wherein the  
2 thickness of said non-conductive substrate is between 0.5 mils and 5 mils.

1                   40. An electronic device package as recited in claim 31 wherein the  
2 thickness of said non-conductive layer is between 0.5 mils and 5 mils.

1                   41. An electronic device package as recited in claim 36 wherein the  
2 thickness of said non-conductive layer is between 0.5 mils and 5 mils.

1                   42. A method of forming an electronic device package comprising the  
2 steps of:

3                   ✓ providing a glass fibers substrate;  
4                   impregnating said substrate with a resin;  
5                   thereafter applying a discrete layer of dielectric material free of glass fibers  
6 over said impregnated substrate;

7                   applying a layer of electrically conductive circuitry over said discrete layer  
8 of dielectric material; and

9                   coupling an electronic device to said electrically conductive circuitry.

1                   43. A method of forming a printed circuit board comprising the steps  
2 of:           ✓

3                   providing a glass fibers substrate;  
4                   impregnating said substrate with a resin;  
5                   thereafter applying a discrete layer of dielectric material free of glass fibers  
6 over said impregnated substrate; and

7 applying a layer of electrically conductive circuitry over said discrete layer  
8 of dielectric material.

1                   45. The method as recited in claim 43 wherein said discrete layer of  
2 dielectric material free of glass fibers is applied to a thickness of between 0.5 mils and 5  
3 mils.

1 / 46. An electronic device package comprising:

2 a glass fibers substrate impregnated with a resin;

3 a discrete layer of dielectric material free of glass fibers over said  
4 impregnated substrate;

5 a layer of electrically conductive circuitry over said discrete layer of  
6 dielectric material; and

7 an electronic device package coupled to said electrically conductive  
8 circuitry.

1                   47. An electronic device package as recited in claim 46 wherein the  
2 thickness of said discrete layer of dielectric material free of glass fibers is between 0.5 mils  
3 and 5 mils.

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